

## ABSTRACT OF THE DISCLOSURE

Input light is split by an input-light splitter into first split light and second split light. A multiplex-interference portion performs multiplex interference of the first split light and the second split light to generate intensity-modulated light having a first wavelength. A phase modulation portion is fed with the intensity-modulated light and continuous wave light having a wavelength equal to a second wavelength, and performs cross-phase modulation of the continuous wave light in accordance with phase modulation of the input light.